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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,042	09/22/2003	John P. O'Brien	5686-05-2	1437
7590	11/17/2005		EXAMINER	
John C. Hilton McCormick, Paulding & Huber, LLP City Place II, 18th Floor 185 Asylum Street Hartford, CT 06103			BERGIN, JAMES S	
			ART UNIT	PAPER NUMBER
			3641	
DATE MAILED: 11/17/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/667,042

Applicant(s)

O'BRIEN ET AL.

Examiner

James S. Bergin

Art Unit

3641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-6 and 11-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-6 and 11-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/24/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of invention 2 in the reply filed on 10/24/2005 is acknowledged. The traversal is on the ground(s) that the inventions 1 and 2 "*reveal for the first time a practical way of avoiding the necessity for enclosing redundant shock tubes in a sheath, or protective extruded covering*". This is not found persuasive in view of the original reasons provided by the examiner in the restriction section of the action mailed 06/22/2005. Furthermore, Kees (EP 0 097 414 A1) at least discloses connecting insulated wires in a side-by-side parallel relationship by means of an adhesive bead between the insulated wires, such disclosure being evidence of the well known nature of adhesive bead connecting means in the prior art at the time that the invention was made. All of the remaining claims in the application, claims 2-6, and 11-17 are drawn to the elected invention 2.

The requirement is still deemed proper and is therefore made FINAL.

Drawings

2. The drawings were received on 10/24/2005. The examiner approves these drawings.

Response to Amendment

3. The declaration filed under 37 CFR 1.132 filed 10/24/2005 is insufficient to overcome the rejection of independent claim 2 based upon the rejections under 35 U.S.C. 103(a) over Shaw (US 5,365,851 A) in view of Rey (US 2,877,708 A) as set forth

Art Unit: 3641

in the last Office action because: Rey (US 2,877,708 A) discloses an equivalent means for bonding tubes together that comprises in part the plastic strip 4 that assists in bonding fuse tubes 3 in an axially parallel and adjacent relationship (col. 2, line 60 – col. 3, line 8; figs. 1-4) in such a way that they can be separated by cutting the strip if so desired (col. 3, lines 36-41). Rey's tubes are **additionally** held in bonded relationship by the extruded plastic that surrounds the outer surface of the tubes in addition to the plastic strip 4 (fig. 2). In any event, independent claim 2 has now been amended so as to define the adhesive as *an adhesive bead*. Rey (US 2,877,708) does not disclose an adhesive bead that bonds the tubes together. The amended claim 2 has now been rejected over Shaw (US 5,365,851 A) in view of newly found art as outlined below.

Claim Objections

4. Claim 3 is objected to because of the following informalities:

pentaphenaltetranitrate appears to be a misspelling.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 11-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

Art Unit: 3641

had possession of the claimed invention. The specification does not disclose that the transmission tubes include outer layers fabricated from a plastic polymer having a vinyl acetate content between 2% and 20% by weight. See specification paragraph [0017] wherein the outer abrasion resistant layer is disclosed as comprising polyethylene or nylon 6 (see also specification paragraphs [0020] and [0023]).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 3, 6, and 11-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 3, it is unclear what precisely defines an equivalent to crystalline pentaphenaltetranitrate?

In claim 6, it is unclear what defines an equivalent to Surlyn. It is noted that the trademark Surlyn has been used in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Regarding claims 11 and 12, it is unclear whether the intention is to claim the outer layers of the transmission tubes or the plastic bead material as being fabricated

from a plastic polymer having a vinyl acetate content between 2% and 20% or preferably 12% (see specification paragraphs [0017], [0020] and [0023]).

In Claim 12, line 2, whether due to a typographical error or not, it appears that the limitation, (*range is about 12%*), *remains* in the claim and renders the claim indefinite because 12% does not define a range. If the intention of the amendment was to cancel (*range is about 12%*), then a strikethrough of the relevant words will accomplish this. It would also appear that the limitation content should be inserted after “vinyl acetate” in line 2, to correct further indefiniteness in this claim.

Claim 13 is now incomprehensible in view of the amendment to claim 11. The transmission tubes have not been disclosed in the specification as including outer layers comprising vinyl acetate and it is not understood how the composition of the outer layers of the transmission tubes influences the pulling force required to separate the tubes from the adhesive bead therebetween.

Claim 14 is indefinite because it depends from the cancelled claim 7.

In claim 15, is indefinite because it indirectly depends from the cancelled claim 7. The limitation, “the spool”, in line 2 lacks a proper antecedent basis (claims 2 or 14 do not claim a spool). It is also unclear whether “on the end of a spool” of line 4 is part of the same spool as “the spool” of lines 2 and 4? . The limitation “the redundant shock tube lacks a proper antecedent basis.

Claim 16 is indefinite because it indirectly depends from the cancelled claim 7. Furthermore, the spool lacks a proper antecedent basis as does the barrel of the spool (claims 2, 14 or 15 do not positively claim a spool). It is unclear whether the tube

Art Unit: 3641

assembly exits the barrel of the spool through the tapered exit hole of the spool flange or just winds off the barrel of the spool?

8. The art-based rejections that follow are made in the light of the indefiniteness outlined above.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw (US 5,365,851 A) in view of Kees (EP 0 097 414 A1).

Regarding claim 2, Shaw discloses a redundant transmission tube assembly comprising at least two discrete transmission tubes 10 arranged in axially parallel and adjacent relationship (col. 8, lines 8-22; fig. 3), each tube 10 have a percussive powder composition inside the tubes (col. 4, lines 5-12), the adjacent tubes 10 inherently held together (fig. 3) along at least a substantial portion of the entire length of said tubes, said tubes being extruded from a synthetic polymer (col. 4, lines 5-12). Shaw is silent as to precisely how the tubes 10 are held together; the reference just fails to make this clear.

However, Kees (EP 0 097 414 A1) discloses an equivalent means for holding insulated wires together in side-by-side parallel relationship, the holding means comprising adhesive beads 6 provided between the insulated wires (abstract, page 5, line 32 – page 6, line 4; page 11, line 7- page 12, line 24).

As an alternative to Shaw's inherent tube holding means, and in view of Kees, to hold Shaw's tubes in side-by-side parallel relationship by providing adhesive beads therebetween, would have been an obvious substitution of a functional equivalent readily available to one of ordinary skill in the art at the time that the invention was made. Thus modified, Shaw's tube assembly would be held in side-by-side parallel relationship by adhesive beads between adjacent tubes along at least a substantial portion of the entire length of said tubes.

Regarding claim 14, this claim is directly dependent from canceled claim 7 and is indefinite as previously mentioned. So, in as much as the claim can be reasonably understood, Shaw discloses that initiators 54 and detonators 57 are affixed to the redundant shock tube assembly at opposite ends thereof (col. 3, lines 8-40; fig. 3).

Regarding claim 15, this claim is indirectly dependent from canceled claim 7, and is indefinite as previously mentioned. So, in as much as the claim can be reasonably understood, Shaw discloses the detonators 57 crimped to one end of the shock tube and being covered by detonator caps 14 (fig. 3), both mounted to an end of the spool 12 by virtue of the shock tubes 10 (fig. 3). Shaw's spool is capable of being housed in a container having only one side opening such as a dispensing box.

Regarding claim 16, this claim is indirectly dependent from canceled claim 7, and is indefinite as previously mentioned. So, in as much as the claim can be reasonably understood, Shaw discloses the spool 12 comprising a flange at each end and at least two holes.

11. Claims 3-6, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw (US 5,365,851 A) in view of Kees (EP 0 097 414 A1), as applied to claim 2 above, and further in view of Thureson et al. (US 4,607,573 A).

Regarding claim 3, Shaw discloses a reactive mixture adhered to the inner surface of the adherent layer of the plastic tube 10 (col. 4 lines 8-12). Shaw does not specifically name this reactive mixture. However, Thureson et al. discloses reactive mixtures comprising PETN or RDX or HMX etc. (col. 3, lines 1-9). Thureson et al.'s reactive mixtures are equivalent to the applicant's claimed reactive mixture in claim 3. It should be noted that applicant discloses on page 4, [0017] that the reactive mixture can comprise HMX. It should also be noted that on page 10, lines 2-4 of the response filed 9/26/2005, the following is stated: "*Applicant does not claim to have originated the materials from which the transmission tubes are made, or the reagent used within the tube for propagating the shock wave*". It would have been obvious, in view of Thureson et al., to one of ordinary skill in the art at the time that the invention was made, to select a reactive mixture comprising HMX or its equivalent, as the reactive mixture lining the tubes of the Shaw/ Kees combination, so as to utilize a ubiquitously well known and readily available reactive mixture for use in a shock tube.

Regarding claim 4, neither Shaw nor Kees disclose an adhesive comprising EVA copolymer with a vinyl acetate content ranging from 2% to 20%.

However Thureson et al. '573 disclose an equivalent plastic adhesive EVA (ethylene vinyl acetate) that possesses excellent adhesive properties (col. 3, lines 1-5). In view of Thureson et al., to select the plastic adhesive EVA (ethylene vinyl acetate) as the constituent plastic adhesive of the polymeric strip of the Shaw/ Kees combination, would have been an obvious substitution of a functional equivalent, within the competence of one of ordinary skill in the art at the time that the invention was made, such a substitution utilizing the excellent adhesive properties of ethylene vinyl acetate. It would further have been obvious to one of ordinary skill in the art at the time the invention was made, to select the EVA copolymer adhesive with a vinyl acetate content somewhere in the range 2% to 20%, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges and discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 5, Shaw discloses that the shock tube 10 comprises an outer resilient layer (col. 4, lines 10-12). However, Shaw does not state that this layer comprises polyethylene or nylon.

However, Thureson et al. '573 disclose a shock tube comprising an outer layer of polyethylene or nylon, to improve the ability of the tube to withstand external damage and mechanical stress (col. 3, lines 14-23). It would have been obvious, in view of

Art Unit: 3641

Thureson et al., to one of ordinary skill in the art at the time that the invention was made to select polyethylene or nylon as the outer layer of Shaw's tube 10, and thereby improve its ability to withstand external damage and mechanical stress.

Regarding claim 6, Shaw discloses the shock tube 10 comprises an inner adherent layer (col. 4, lines 8-12) but does not state that this layer comprises SURLYN.

However, Thureson et al. discloses the plastic tube 22 comprising SURLYN (col. 2, lines 65-67; fig. 2), such plastics providing excellent adhesion of the outer coating layer 24 (col. 3, lines 1-5). It would have been obvious, in view of Thureson et al., to one of ordinary skill in the art at the time that the invention was made to select SURLYN as constituent material of Shaw's inner adherent layer and so advantageously provide excellent adhesion of Shaw's outer layer thereto.

Regarding claims 11 and 12, in as much as the claims can be understood due to the indefiniteness discussed above, Shaw discloses that the *shock tube 10 is a conventional shock tube comprising a plastic tube having an outer, resilient layer and an inner, adherent layer, and having a reactive material adhered to the inner surface thereof* (col. 4, lines 8-12) but does not state that this layer is fabricated from a plastic polymer having a vinyl acetate content of between 2% to 20% by weight or preferably about 12% by weight.

It is noted that on page 10, lines 2-4 of the response filed 9/26/2005, the following is stated: "*Applicant does not claim to have originated the materials from which the transmission tubes are made, or the reagent used within the tube for propagating the shock wave*".

The examiner takes official notice that to form the outer layer of a shock tube from a plastic polymer comprising vinyl acetate was within the skill level of one of ordinary skill in the art prior to the invention of the instant application, such a polymer possessing appropriate protective and flexibility properties for the working environment of shock tubes. In view of this official notice, it would have been obvious to one of ordinary skill in the art the time that the invention was made, to form the outer layers of Shaw's tube from a plastic polymer comprising vinyl acetate, such a polymer possessing the appropriate protective and flexibility properties for the working environment of a shock tube. It would further have been obvious to one having ordinary skill in the art at the time the invention was made to select the ethylene vinyl acetate layer of Shaw's transmission tubes with a vinyl acetate content somewhere in the range 2% to 20% by weight, preferably 12% by weight, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges and discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 13, Kees discloses that the adhesive bead is selected to achieve a predetermined separation force to separate the two insulated wires without damaging the insulation thereof during the separation process (page 13, lines 4-18). In view of this teaching, it would have been obvious to one of ordinary skill in that art at the time that the invention was made, to select the adhesive beads of the Shaw/ Kees combination such that they possessed a predetermined separation force to separate the

Art Unit: 3641

bonded transmission tubes in a manner that would not damage the outer surface of either transmission tube.

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw (US 5,365,851 A) in view of Kees (EP 0 097 414 A1), as applied to claim 2 above, and further in view of Shaw (US 5,001,981)

Shaw '851 does not disclose that each shock tube 10 is of a different external color for identification purposes. However, Shaw '981 discloses that the individual shock tubes 17 may be color coded to ensure that they are properly connected to the desired initiators and detonators (col. 4, lines 37-41). It would have been obvious, in view of Shaw '981, to one of ordinary skill in the art at the time that the invention was made to color code the shock tubes of the Shaw '851/ Kees combination, so as to ensure that they be properly connected to the desired initiators and detonators.

Allowable Subject Matter

13. The previous indication of the allowability of claim 13 is withdrawn in view of the amendment to claim 11, from which claim 13 indirectly depends (see above 35 USC 112 1st and 2nd paragraph rejections of claims 11-13) and in view of the new art rejection of Shaw (US 5,365,851 A) in view of Kees (EP 0 097 414 A1), and further in view of Thureson et al. (US 4,607,573 A).

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Simon et al (US 5,661,405) discloses use of an adhesive bead in bonding the sleeves 30 along a full length thereof; GB 2 029 629 A (Baverstock) and FR

Art Unit: 3641

2 446,532 (Maupoux) disclose bonding electrical cables together in side-by-side relationship.

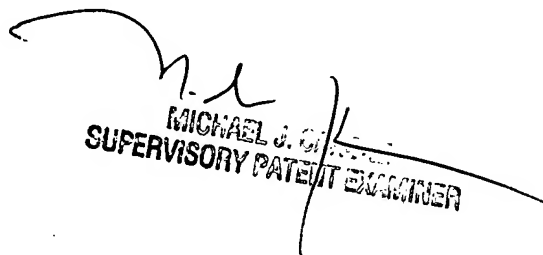
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Bergin whose telephone number is 571-272-6872. The examiner can normally be reached on Monday - Wednesday and Friday, 8.30 - 5.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 571-272-6873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James S. Bergin



MICHAEL J. CARONE
SUPERVISORY PATENT EXAMINER



*Approved
 11/10/2005
 SB*

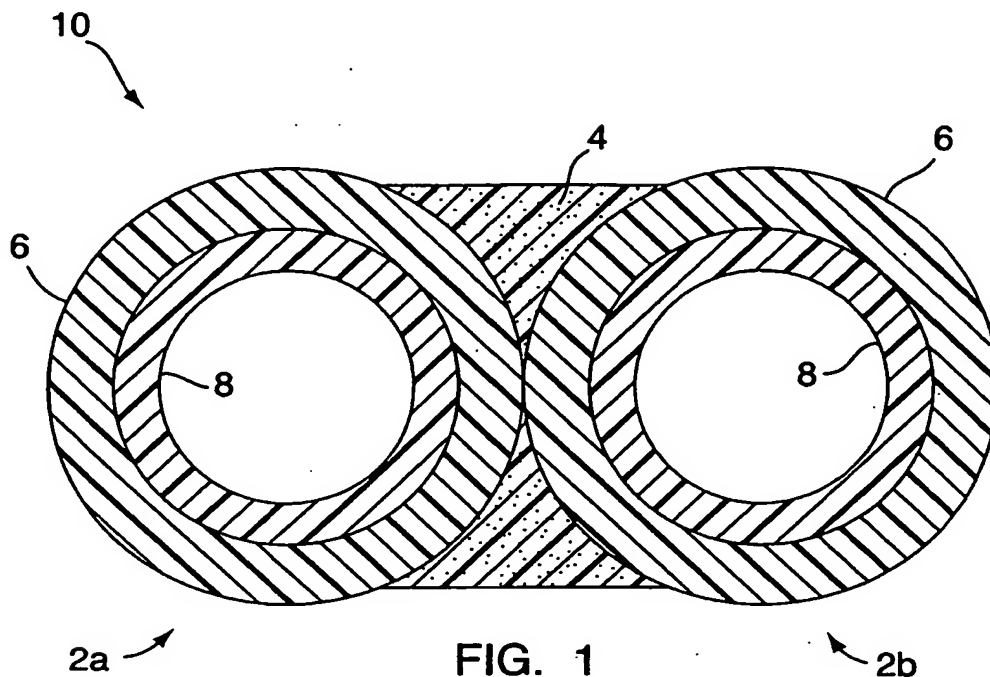


FIG. 1

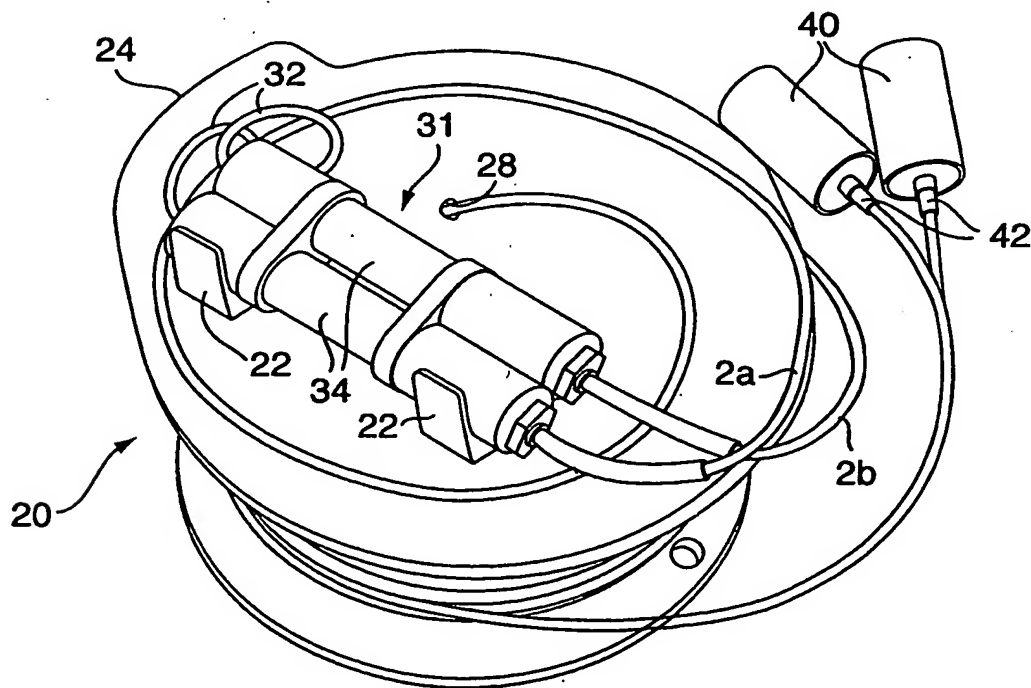


FIG. 2

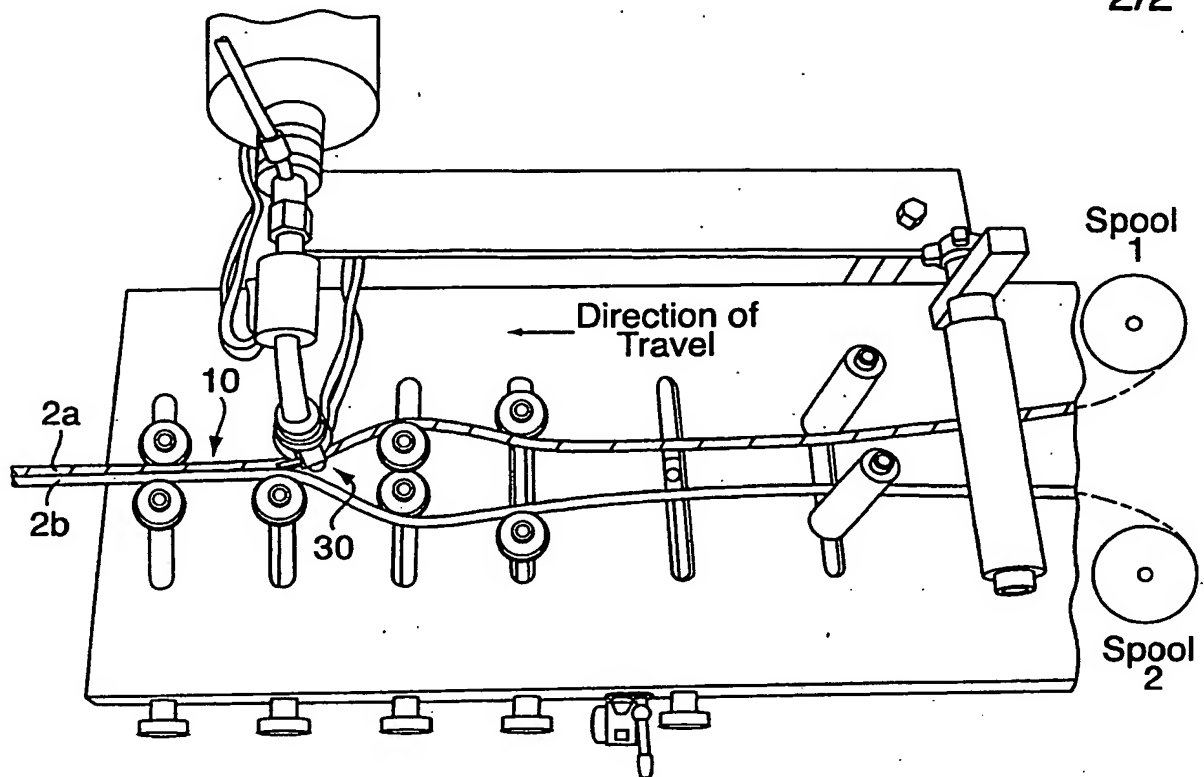


FIG. 3

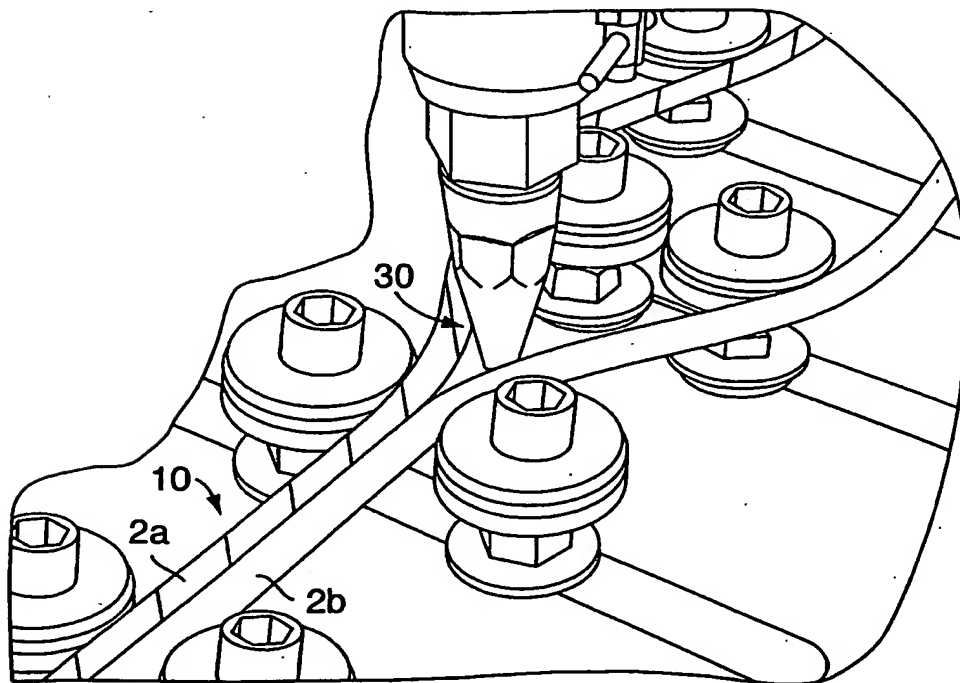


FIG. 4